1974 Computer Design Index

An up-to-date listing of feature articles published this year

COMPUTERS

Automatic Test Systems

A Control Storage Simulator for Debugging Microprograms, P. Breeden ..... Apr, p 150
What the User Should Know About Computer-Controlled Testing, P. C. Jackson ..... Oct, p 97

Design Systems

Logic Design and Its Recent Development; Part 6: Computer-Aided Logic Design, S. Y. H. Su ..... Feb, p 77

General

A Formal Design Language for Digital Systems, R. Crall ..... Nov, p 103
Hardware Allocation of Data System Resources, G. L. Anderson and K. Bartlett ..... July, p 89
Microprogramming: A General Design Tool, R. Jaeger ..... Aug, p 150
Top-Down Approach to LSI System Design, H. D. Caplener and J. A. Janku ..... Aug, p 143

Microprocessors

A Fresh View of Mini- and Microcomputers, S. Davis ..... May, p 67
Current Microcomputer Architecture, R. M. Holt and M. R. Lemas ..... Feb, p 65
Designing Optimized Microprogrammed Control Sections for Microprocessors, G. W. Schultz ..... Apr, p 119
Digital Automation Microcomputer Features LSI/SOS Processor Chip ..... Jan, p 102
Distributed Function Microprocessor Architecture, A. Weissberger ..... Nov, p 77
Indexed Jump Feature for Intel 8008 Microprocessor, D. L. Abbott ..... June, p 112
Microprogramming Kit Allows User To Form Custom Microprocessors ..... Aug, p 162
Monolithic Processors, H. Schmid ..... Oct, p 87
Performance and Control of Multiple Microprocessor Systems, G. R. Reyling, Jr ..... Mar, p 81

Minicomputers and Small Computers

A Fresh View of Mini- and Microcomputers, S. Davis ..... May, p 67
An Improved Minicomputer Program Interrupt Structure, A. Allison ..... Jan, p 81
Emulator-Microprogrammable Minicomputers Provide Hardware/Software Interface Compatibility ..... May, p 122
Increasing Minicomputer Speed with Emitter-Coupled Logic, J. DeLaune ..... Feb, p 90
Minicomputers Offer High Speed Cache Memory ..... Nov, p 120

Multiprocessors

Hardware Allocation of Data System Resources, G. L. Anderson and K. Bartlett ..... July, p 89

Other Classes of Digital Computers

Design Considerations for Aerospace Digital Computers, J. Jurison, D. A. Iser, and B. J. Russell ..... Aug, p 113

CONFERENCES

COMPCON 74: IEEE Computer Society International Conference ..... Jan, p 58
COMPCON 74 FALL: IEEE Computer Society International Conference ..... Aug, p 93
INTERCON 74: IEEE International Convention and Exposition ..... Feb, p 56; Mar, p 58
International Electron Devices Meeting ..... Nov, p 72
ISA-74: Instrument Society of America International Show ..... Oct, p 68
ISSCC 74: IEEE International Solid-State Circuits Conference ..... Jan, p 60
NCC 74: National Computer Conference and Exposition ..... Apr, p 67
NEREM 74: IEEE Northeast Electronics Research and Engineering Meeting ..... Oct, p 78
SID 74: Society for Information Display International Symposium ..... Apr, p 116
Twentieth Annual Conference on Magnetism and Magnetic Materials ..... Nov, p 70
WESCON 74: Western Electronics Show and Convention ..... Aug, p 96

DATA COMMUNICATIONS

Data Communications Interfaces

Computer Interface-Timing Control Logic, T. O. Anderson ..... Feb, p 96

Communications Multiplexers

A Time Division Multiple Access System for Digital Communication, D. G. Willard ..... June, p 79

Communications Test Equipment

Implementation of a Parallel Cyclic Redundancy Check Generator, K. M. Helness ..... Mar, p 91

General

AT&T's Digital Transmission Service ..... June, p 10
Automatic Dialing for Computer Communications, T. J. McShane ..... Apr, p 146
Communications Code Compatibility ..... May, p 11
Communications Software: Application Overview ..... Sept, p 16
Communications Software: Functional Considerations ..... Oct, p 12
Design Technique for a Near-Field Communication System, A. A. Smith, Jr ..... Sept, p 85
Functional Approach to Information Network Design, H. B. Becker ..... May, p 83
Intelligent Networks ..... Dec, p 10
Non-Communications Programming Acronyms ..... Nov, p 14
Packet Switching ..... Apr, p 10
Remote Data Terminal Selection ..... Aug, p 10
Telecommunications Diagnostics ..... Feb, p 10
Telecommunications System Measurements ..... Mar, p 12
Telephone Controllers ..... Jan, p 11
Terminals: Human Factor Considerations ..... July, p 8

DIGITAL CIRCUITS

Arithmetic Circuits

A Multivibrator Using RC-Coupled Cascade Stages as a Ring Counter, S. Chang and P-L. Lam ..... May, p 120

Operation of Programmable Frequency Dividers, A. C. Erdman ..... May, p 110

Digital Integrated Circuits

A Cellular Array for Integer and Fractional BCD-Binary Conversion, J. G. Bredeson, ... May, p 104
Another Use for NAND Gates, J. Miles ..... Dec, p 84
CMOS Enhances Video Display Terminal Design, K. Karstad ..... Sept, p 91
Hardware Binary-to-BCD Conversion and BCD Addition, R. A. Bernay ..... Mar, p 98
Logic Design and Its Recent Development; Part 5: Fault Diagnosis in Digital Networks, S. Y. H. Su ..... Jan, p 87
Monolithic Processors, H. Schmid ..... Oct, p 87

Linear Integrated Circuits

A Universal Bipolar/MOS Clock Driver, J. Roberts and C. Chan ..... Apr, p 152

Logic Circuits

Complementary MOS Four-Phase Logic Circuits, NASA ..... Sept, p 110
Design of a Programmable One-Shot Multivibrator, L. Ruggeri ..... Mar, p 110
Using p/ROMs as Logic Elements, D. C. Wyland ..... Sept, p 98

Oscillators

A Low Cost, Crystal-Controlled Oscillator Design, R. A. Mancini ..... Jan, p 94

DIGITAL MATHEMATICS AND LOGIC DESIGN

Arithmetic

Algorithm for Computing Logarithms and Antilogarithms, M. Ciugudean ..... July, p 106

Digital Logic and Switching Theory

Congruent Partitioning and Network Synthesis, J. R. Logan ..... Dec, p 53
Logic Design and its Recent Development; Part 6: Computer-Aided Logic Design, S. Y. H. Su ..... Feb, p 77

Information Theory

Enciphering Data for Secure Transmission, C. H. Meyer ..... Apr, p 129
Implementation of a Parallel Cyclic Redundancy Check Generator, K. M. Helness ..... Mar, p 91

Number Representation and Conversion

A BCD Conversion Technique for Teletypewriter Applications, C. Ellsworth and W. Malloch ..... Dec, p 69
A Cellular Array for Integer and Fractional BCD-Binary Conversion, J. G. Bredeson ..... May, p 104
Hardware Binary-to-BCD Conversion and BCD Addition, R. A. Bernay ..... Mar, p 98
Self-Checking Number Systems, J. R. Herr ..... June, p 85

HARDWARE

Buses

Implications of Busing for Cellular Arrays, F. Heutink ..... Nov, p 95

Connectors

Other Performance Factors in PC Board Connectors, C. Ladstatter ..... Nov, p 112

Semiconductor Components

Field-Effect Transistors as Analog Switches, S. Givens ..... June, p 106

INPUT/OUTPUT AND RELATED EQUIPMENT

Character Recognition Equipment

Algorithm for a Low Cost Hand Print Reader, A. W. Holt ..... Feb, p 85
Subminiature 4-Bar Code Is Key to High Speed, High Accuracy Optical Page Reader ..... June, p 116

Display Equipment

Addressing the Elements of a Visual Display, J. E. Bryden ..... Nov, p 85
CMOS Enhances Video Display Terminal Design, K. Karstad ..... Sept, p 91

Graphic Equipment

High Speed Character Generator for Graphics Terminals, J. A. Glaab ..... Mar, p 106

Intelligent Terminals

CRT Terminal Gains Adaptability Through Use of Microprocessor and Erasable ROMs ..... Oct, p 122

Interface Equipment

Interfacing the Teletypewriter; Part 1: A-D and D-A Converters, M. Klapfish ..... June, p 94
Interfacing the Teletypewriter; Part 2: Programming Remote Relays, Solenoids, and Other Power Devices, M. Klapfish ..... July, p 100

Mark and Code Recognition Equipment

Printers and Readers Handshake for Effective Bar Code System, G. Whittaker and W. Sexton .. Sept, p 69

Terminal Equipment

A BCD Conversion Technique for Teletypewriter Applications, C. Ellsworth and W. Malloch ..... Dec, p 69
Choosing Proper Computer Output Systems, I. Wieselman ..... Dec, p 63
Interfacing the Teletypewriter; Part 1: A-D and D-A Converters, M. Klapfish ..... June, p 94
Interfacing the Teletypewriter; Part 2: Programming Remote Relays, Solenoids, and Other Power Devices, M. Klapfish ..... July, p 100

Other Input/Output Equipment

Low Cost Bus Switch Permits Processors To Share Common Peripherals ..... Sept, p 112

INSTRUMENTATION AND CONTROL EQUIPMENT

Analog-Digital and Digital-Analog Conversion Equipment

14-Bit DAC Family Features Guaranteed Monotonicity ..... Apr, p 156
Interfacing the Teletypewriter; Part 1: A-D and D-A Converters, M. Klapfish ..... June, p 94
Noise Effects on Analog-to-Digital Conversion Accuracy: Part 1, B. M. Gordon ..... Mar, p 65
Noise Effects on Analog-to-Digital Conversion Accuracy: Part 2, B. M. Gordon ..... Apr, p 137
Specifying Settling Time for Current-Switched D-A Converters, Computer Labs ..... Mar, p 112

Code Converters

A Cellular Array for Integer and Fractional BCD-Binary Conversion, J. G. Bredeson ..... May, p 104

Data and Signal Generators; Clocks

A Computer Read/Write Clock, W. Nadler and G. G. McDonald ..... Sept, p 102
A Digitally Controlled Pulse Generator for FM Demodulation, V. L. Appleby ..... July, p 83
Generating a 10-Hz Clock From a 50/60-Hz Line, A. R. Rosenbaum ..... Oct, p 118

Suddenly, a small plotter with speed

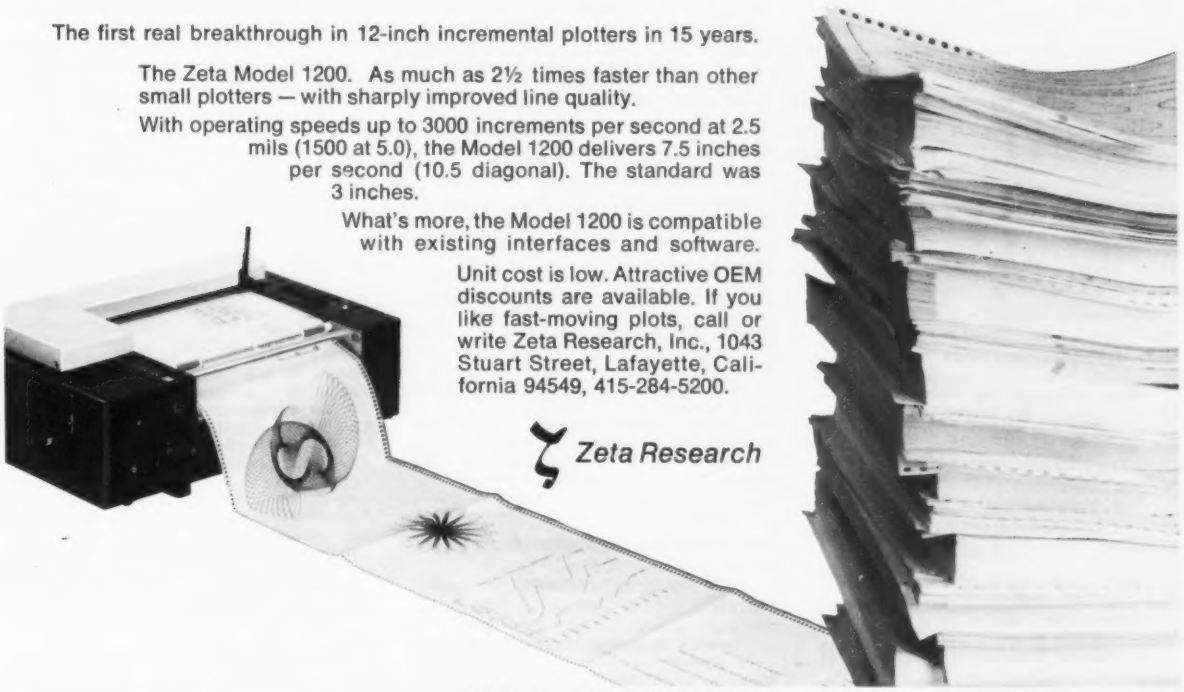
The first real breakthrough in 12-inch incremental plotters in 15 years.

The Zeta Model 1200. As much as 2½ times faster than other small plotters — with sharply improved line quality.

With operating speeds up to 3000 increments per second at 2.5 mils (1500 at 5.0), the Model 1200 delivers 7.5 inches per second (10.5 diagonal). The standard was 3 inches.

What's more, the Model 1200 is compatible with existing interfaces and software.

Unit cost is low. Attractive OEM discounts are available. If you like fast-moving plots, call or write Zeta Research, Inc., 1043 Stuart Street, Lafayette, California 94549, 415-284-5200.



Zeta Research

CIRCLE 54 ON INQUIRY CARD

High Speed Character Generator for Graphics Terminals, J. A. Glaab ....Mar, p 106

Inexpensive Programmable Computer Clock, NASA ....June, p 114

Monitoring and Control Equipment

Interfacing the Teletypewriter; Part 2: Programming Remote Relays, Solenoids, and Other Power Devices, M. Klapfish ....July, p 100

Process/ and Instrument/Computer Interfaces

A General-Purpose Interface for Industrial Process Control, F. J. Trudo ....Dec, p 78

Synchro-Digital and Digital-Synchro Conversion Equipment

Conversion of Resolver or Synchro Trigonometric Outputs to Digital Data, E. L. Griffin ....Oct, p 105

Other Test and Measuring Instruments

Measuring Settling Time, H. W. Crowley ....Oct, p 120

MEMORY/STORAGE EQUIPMENT

General

Advances in Memory Technology, H. F. Koehler ....June, p 71

Design Considerations for Ruggedized Memories, M. J. Maloney and S. Murahashi ....May, p 114

Increasing Memory System Speed with a High Speed Buffer, Signetics Corp ....May, p 118

Magnetic Core Storage

Interchangeable Core Memory Modules Feature 16K and 32K Sense Lines ....Mar, p 116

Magnetic Disc and Drum Storage

Flexible Disc Recorder Module Is Field Expandable to Dual Disc/Dual Head Configuration ....Feb, p 104

Jitter-Free Displays of Disc File Data, R. Beville ....Dec, p 80

Magnetic Tape Cassette/Cartridge Storage

An Approach to Digital Recording by Low Cost Audio Cassette, F. W. Etcheverry ....Oct, p 112

Update on Magnetic Tape Memories, S. Davis ....Aug, p 127

Magnetic Tape Storage

Data Rate Servo for Phase-Encoded Recording Systems, W. J. Kelly ....Sept, p 77

Read-Only Storage

An Associative-Capacitive ROM for Reprogrammable Logic Applications, M. Quinones ....Jan, p 98

Semiconductor Storage

Amorphous Semiconductors for Electrically Alterable Memory Applications, R. R. Shanks ....May, p 95

Bipolar, 4K-Bit p/ROMs Feature 70-ns Access Time ....Dec, p 86

Large Bipolar ROMs and p/ROMs Revolutionize Logic and System Design, J. McDowell ....June, p 100

1K Bipolar RAMs Feature 30-ns Typical Access Time ....July, p 108

Selection and Application of Semiconductor Memories, S. Davis ....Jan, p 65

POWER REGULATORS AND PROTECTORS

Specifying and Selecting Uninterruptible Power Supply Systems, J. A. Camuso, J. N. Holsher, and C. G. Helmick ....July, p 63

OTHER

Software

A Formal Design Language for Digital Systems, R. Crall ....Nov, p 103

GUIDE TO PRODUCT INFORMATION

NOTE: The number associated with each item in this guide indicates the page on which the item appears—**not** the reader service number. Please do **not** circle the page number on the reader service card.

PAGE

MATERIALS

METALS AND METAL FORMS

Precision-Machined Cast Aluminum Plate
Amax Aluminum Mill Products 97

HARDWARE

CABINETS AND ENCLOSURES

Carrying Cases
Zero Manufacturing 51

CONNECTORS AND INTERCONNECTION SYSTEMS

Connectors
AMP 33-36

Card Edge Connectors
Methode Electronics 100

Plastic Junction Shell
ITT/Cannon Electric 93

Cable/Connector Assemblies
Shigoto Industries 93

FANS AND BLOWERS

Fan
IMC Magnetics/New Hampshire 107

INDICATORS; READOUTS; DIGITAL DISPLAYS; LAMPS

Panel Display
Burroughs/Electronic Components .. 89

Programming Display
Advanced Digital Systems 98

PANELS AND BACKPLANES

Logic Panels
Augat 11

Interfacing and Diagnostic Test Panels
Mupac 96

Termination Equipment
AMP 33-36

PC BOARDS

Printed Circuit Board
Lockheed Electronics/Data Products 98

WIRE AND CABLE

Wire and Cable
Brand-Rex 47

Wire Dispenser
Belden/Electronic 21

COMPONENTS AND ASSEMBLIES

DELAY LINES

Dynamic Delay Line
Technitrol 92

FILTERS

EMI Filter
Electrocube 100

MOTORS; ROTATIVE COMPONENTS

Miniature Motor
Micro Switch/Honeywell 5, 90

DC Servomotors
Portescap U. S. 32, 98

Small-Angle VR Stepper Motors
Singer/Kearfott 90

PHOTODEVICE ASSEMBLIES

Opto-Isolators
Monsanto Commercial Products ... 87

PAGE

POWER SOURCES, REGULATORS AND PROTECTORS

Power Supplies
Powertec .....**Cover II**

Open-Frame DC Power Supplies
Lambda Electronics 90

Power Supply Modules
Abbott Transistor Laboratories 90

RELAYS

Opto-Isolated Relay
Hamlin 90

SEMICONDUCTOR COMPONENTS

Schottky Diode
TRW Power Semiconductors 101

SWITCHES

DIP Slide Switch
Duncan Electronics/Systron Donner 12, 92

Miniature Slide Switches
AMF/UID Electronics 100

Memory Switch
Plessey Memories 90

Solid-State Switching Array
Counterscan Systems 100

CIRCUITS

CIRCUIT CARDS AND MODULES

Modem Cards
Sanders Associates 44

Core Memory Modules
Ampex/Memory Products 8

Integrated CPU and MOS Memory Boards
Memory Technology 88

Memory Buffer Cards
Fabri-Tek 93

Bipolar ROM Simulation Modules
Scientific Micro Systems 92

DIGITAL INTEGRATED CIRCUITS

CMOS Circuit Devices
Harris Semiconductor/Harris 62

NAND Gates and Inverters
Signetics 96

CMOS MSI Adder and Complementer
Motorola/Semiconductor Products .. 99

RAMs
American Microsystems 82

N-Channel MOS RAM
Nortec Electronics 101

NMOS 1K Static RAMs
Texas Instruments 97

Bipolar 4K-Bit p/ROMs
Intel 86

MEMORY/STORAGE EQUIPMENT

BUFFER MEMORIES

Memory Buffer Cards
Fabri-Tek 93

FLEXIBLE DISC STORAGE EQUIPMENT

Flexible Disc Drive
California Computer Products 68

Flexible Disc Systems
Datapoint 94
Dicom Industries 96
Tri-Data 41
Xebec Systems 93

PAGE

Flexible Disc
BASF Systems 61

MAGNETIC CORE STORAGE EQUIPMENT

Add-On Core Memories
Cambridge Memories 7

Core Memory Systems
Ampex/Memory Products 8

MAGNETIC DISC AND DRUM STORAGE EQUIPMENT
(See also Flexible Disc Storage Equipment)

Disc Drives
Davis-Smith 99
Decision 92
Diablo Systems .....**Cover IV**

Disc Memory Systems
Data Disc 85

Cartridge Disc System
Advanced Electronic Design 99

Double-Density Cartridges and Disc Packs
3M 98

MAGNETIC TAPE STORAGE EQUIPMENT

Tape Drives
Wangco 43

Cassette Tape Drive
Interdyne 4

Cassette Recorders
Raymond Engineering 28

Cartridge Tape System
Metra Instruments 92

Tape Formatter
Bright Industries 96

MEMORY/STORAGE TEST EQUIPMENT

Disc, Drum, Tape Memory Tester
Tektronix 45

READ-ONLY MEMORIES; ROM PROGRAMMERS
(See also Semiconductor Storage Equipment)

Bipolar ROM Simulation Modules
Scientific Micro Systems 92

SEMICONDUCTOR STORAGE EQUIPMENT

RAMs
American Microsystems 82

N-Channel MOS RAM
Nortec Electronics 101

NMOS 1K Static RAMs
Texas Instruments 97

Bipolar 4K-Bit p/ROMs
Intel 86

INPUT/OUTPUT AND RELATED EQUIPMENT

CHARACTER RECOGNITION EQUIPMENT

OCR System
SCM Kleinschmidt 90

DATA TERMINALS

Data Terminals
Bell Laboratory 27

Data Terminal System
Teletype 13-16

Intelligent Terminal System
Data Measurements 94

CRT Display Terminals
Lear Siegler 19

PAGE

Upper/Lower Case CRT Terminal Research 98
Buffered/Conversational-Mode CRT Terminal TEC/Systems 95
Video Display Terminal with Pointer Javelin Electronics/Apollo Lasers ..100

DISPLAY EQUIPMENT
(See also Data Terminals and Graphic Equipment)
5" CRT Display Motorola Display Products 92

GRAPHIC EQUIPMENT
Optical Digitizer **EMR Photoelectric** 102
Data Tablets Talos Systems 92

INTERFACE EQUIPMENT; CONTROLLERS
Interface Boards **MDB Systems** 101
Parallel BCD-to-Keypunch Interface Numonics 94
Computer-to-Computer Interface Computrol 95
Nova-Univac/Terminet Interfaces Command, Control and Communications 92
Printer/Plotter Controller Gould/Instrument Systems 94
Computer-Printer Controller Spur Products 98
Tape Formatters Bright Industries 96

KEYBOARD EQUIPMENT
Keyboards **Micro Switch/Honeywell** 29
Tactile Tape Keyboard Clare-Pendar 101
Numeric Keyboard Lear Siegler/Electronic Instrumentation 90

OTHER INPUT/OUTPUT EQUIPMENT
Programming Display Advanced Digital Systems 98
Optical Program Loader Opto-Logic 97
Memory Switch Plessey Memories 90

PAPER TAPE EQUIPMENT
Paper Tape Reader **Decitek/Jamesbury** 94
Photoelectric Paper Tape Readers Chalco Engineering .....100 **Tally** 2

PLOTTING EQUIPMENT
Incremental Plotter **Zeta Research** 105

PRINTER/PLOTTERS
Printer/Plotter **Varian Data Machines** .....Cover III
Printer/Plotter Controller Gould/Instrument Systems 94

PRINTING EQUIPMENT
Line Printer **Tally** 1
Serial, Impact Printer Centronics Data Computer 90
Electro Discharge Printer Hycom 100
Matrix Printers Control Data ..... 96 Printronix .....101 Versatec 96
Printer Mechanism **Computer Devices/OEM Products** .. 96
Parallel BCD-to-Keypunch Interface Numonics 94
Computer-Printer Controller Spur Products 98

COMPUTERS AND COMPUTER SYSTEMS

AUTOMATIC TEST SYSTEMS
Automatic Digital Logic Test System **Hughes/Automation Analysis** 37

COMPUTER AUXILIARY UNITS
Optical Program Loader Opto-Logic 97
PDP-8/e Remote Front Panel Douglas Electronics 93

PAGE

MICROCOMPUTERS AND MICROPROCESSORS
Microprocessor **Process Computer Systems** 38
Integrated CPU and MOS Memory Boards Memory Technology 88

MINICOMPUTERS
Minicomputers
Computer Automation 97
Data General 30
Digital Equipment 22, 94
General Automation 52
Hewlett-Packard 48, 91
Varian Data Machines 25

DATA COMMUNICATIONS EQUIPMENT

COMMUNICATIONS INTERFACES
Computer-to-Computer Interface Computrol 95
Nova-Univac/Terminet Interfaces Command, Control and Communications 92

DATA TRANSMISSION EQUIPMENT
Microcircuit Touch-Tone Receiver Tone Technology 98
Computer-to-Computer Transmission System Computrol 95

MODEMS; DATA SETS
Data Modems **Sanders Associates** 44
9600-Bit/s Multiport Modem International Communications/Milgo 88

DATA ACQUISITION AND CONTROL EQUIPMENT

ANGLE AND POSITION ENCODERS
Optical Rotary Encoder Teledyne Gurley 94

MONITORING AND CONTROL EQUIPMENT
Motor Control **Multiplex Communications** 24

PAGE

TEST AND MEASUREMENT EQUIPMENT; INSTRUMENTATION

DATA GENERATORS
Universal Signal Source Interstate Electronics 88

DIGITAL EQUIPMENT TESTERS
Automatic Digital Logic Test System **Hughes/Automation Analysis** 37
Logic Tester **Tektronix** 45
Logic Analyzer Digital Laboratories 95

INSTRUMENT GENERATORS
Function Generator Advanced Electronics 100

METERS
Digital Multimeter **John Fluke Mfg.** 95

OSCILLOSCOPES
Digital Oscilloscope Trigger Modules **Tektronix** 45

OTHER TEST AND MEASUREMENT EQUIPMENT
Wire Identifier Addison/Muirhead 92

OTHER PRODUCTS; SERVICES

BOOKS; PERIODICALS
Index to Technical Articles **AMT Desktop Index** 101
Survey on Test Generation **Breuer & Associates** 95

EMPLOYMENT OPPORTUNITIES
Employment Opportunity **G. D. Searle/Medical Instrumentation** 97

EQUIPMENT BUYING, SELLING, AND LEASING
Used Electronic Equipment **Mandrel Products** 99

NEW NEW NEW

IMC introduces fan for cooling sandwiched areas

IMC's new, high performance FULMAR fan features maximum efficiency for cooling high power density enclosures and rows of printed circuit board arrays. Unique design of this fan allows for convenience of "Side by Side" mountings for maximum airflow distribution and stable motor performance under low voltage (brown out conditions). Fulmar's low noise level is a natural for computer room use.

4-3/4" diameter by 5-29/32"

FEATURES
- A compact 2" in depth
- Meets U.L. recognition requirements
- Automatic reset overload protector is standard
- Capacitor supplied with unit

50/60 HZ AIRMOVER

imc

Circle the "Bingo" for details! For immediate service please call Fred Taylor, Sales Manager at (603) 332-5300 or write:

IMC MAGNETICS CORP.
NEW HAMPSHIRE DIVISION
ROUTE 16B, ROCHESTER, NEW HAMPSHIRE 03867

CIRCLE 55 ON INQUIRY CARD